

AMENDMENTS TO THE CLAIMS

1. (Previously presented) A chemical reaction monitoring system for parallel monitoring of a plurality of chemical reactions, said system comprising:
 - a plurality of wells, each well of said plurality of wells comprising a reagent for a chemical reaction;
 - a lighting device for illuminating the plurality of wells;
 - a camera device configured to obtain an image of the plurality of wells
 - an analyzer program for determining a specific value corresponding to the extent of chemical reaction within each well at the time the image was obtained;
 - an analyzer program for determining whether a difference between a value expected if the chemical reaction is successful and said specific value indicates failure of the chemical reaction within a well; and
 - a dispensing device configured to discontinue reagent delivery to one or more wells where failure is indicated while maintaining reagent delivery to wells where failure is not indicated.
2. (Original) The chemical reaction monitoring system of claim 1, wherein the chemical reaction is oligonucleotide synthesis.
3. (Original) The chemical reaction monitoring system of claim 1, wherein said plurality of wells comprises a multi-well plate.
4. (Original) The chemical reaction monitoring system of claim 1, wherein said lighting device comprises a light emitting diode (LED) array.
5. (Original) The chemical reaction monitoring system of claim 4, wherein said LED array includes a first array and a second array positioned on either side of a multi-well plate-viewing window.
6. (Original) The chemical reaction monitoring system of claim 4, wherein said LED array includes a single array positioned pivotally mounted on one side of a multi-well plate-viewing window.
7. (Original) The chemical reaction monitoring system of claim 1, wherein said camera device comprises a charge couple device (CCD) capable of imaging the plurality of wells simultaneously.

8. (Previously presented) The chemical reaction monitoring system of claim 1, wherein said analyzer program processes said image.

9. (Previously presented) A chemical synthesis system comprising:

(a) a sample holder placed to support a plurality of wells;
(b) a liquid dispenser placed to dispense a liquid to said plurality of wells;
(c) a liquid removal device placed to remove said liquid from said plurality of wells;

(d) a lighting device for illuminating said plurality of wells;

(e) a camera device configured to obtain image of said plurality of wells; and

(f) a computer system configured to:

(i) determine a specific value corresponding to the extent of chemical reaction within each well at the time the image was obtained;

(ii) determine whether a difference between a value expected if the chemical reaction is successful and said specific value indicates failure of the chemical reaction within a well; and

(iii) signaling said liquid dispenser to discontinue reagent delivery to one or more wells where failure is indicated while maintaining reagent delivery to wells where failure is not indicated.

10. (Previously presented) The system of claim 9, wherein said computer system is further configured to write specific values to a data storage location.

11. (Previously presented) The system of claim 9, wherein a warning message is generated if said specific values are within a pre-defined range of failure.

12. (Original) The system of claim 9, wherein said liquid removal device comprises a centrifuge rotor for orbiting said plurality of wells about an axis of rotation.

13. (Original) The system of claim 9, wherein said liquid removal device comprises a liquid aspirating tube.

14. (Original) The system of claim 9, wherein the chemical reaction is oligonucleotide synthesis.

15. (Original) The system of claim 9, wherein said plurality of wells comprises a multi-well plate.

16. (Original) The system of claim 9, wherein said lighting device comprises a light emitting diode (LED) array.

17. (Original) The system of claim 14, wherein said LED array includes a first array and a second array positioned on either side of a multi-well plate-viewing window.

18. (Original) The system of claim 14, wherein said LED array includes a single array positioned pivotally mounted on one side of a multi-well plate-viewing window.

19. (Original) The system of claim 9, wherein said camera device comprises a charge couple device (CCD) capable of imaging the plurality of wells simultaneously.

20-28. (Canceled)

29. (Previously presented) The system of claim 1, wherein said one or more wells is a subset of wells where failure is indicated.

30. (Previously presented) The system of claim 1, wherein said analyzer program includes an instruction to resume reagent delivery to said one or more wells if one or more criteria are met.

31. (Previously presented) The system of claim 2, wherein said analyzer program includes an instruction to resume reagent delivery to said one or more wells if the value of the synthesis is greater than the cost of the synthesis.

32. (Previously presented) The system of claim 1, wherein the value expected if the chemical reaction is successful and said specific value each comprises a plurality of measurements.

33. (Currently amended) The system of claim 32, wherein said analyzer program includes an instruction to indicate failure if the change in difference between the value expected if the chemical reaction is successful and said specific value comprises an increasingly negative slope.

34. (Previously presented) The system of claim 9, wherein said one or more wells is a subset of wells where failure is indicated.

35. (Previously presented) The system of claim 9, wherein said analyzer program includes an instruction to resume reagent delivery to said one or more wells if one or more criteria are met.

36. (Previously presented) The system of claim 14, wherein said analyzer program includes an instruction to resume reagent delivery to said one or more wells if the value of the synthesis is greater than the cost of the synthesis.

37. (Previously presented) The system of claim 9, wherein the value expected if the chemical reaction is successful and said specific value each comprises a plurality of measurements.

38. (Currently amended) The system of claim 37, wherein said analyzer program includes an instruction to indicate failure if the change in difference between the value expected if the chemical reaction is successful and said specific value comprises an increasingly negative slope.

39. (Previously presented) A system for monitoring polymer synthesis, said system comprising:

a plurality of wells, each well of said plurality of wells providing a location for the synthesis of a polymer from a plurality of reaction components;

an analyzer program for determining a specific value corresponding to the extent of incorporation of a reaction component into a growing polymer within each well;

an analyzer program for determining whether a difference between a value expected if incorporation of the reaction component into the growing polymer is successful and said specific value indicates failure of the polymer synthesis within a well; and

a dispensing device configured to discontinue reagent delivery to one or more wells where failure is indicated while maintaining reagent delivery to wells where failure is not indicated.

40. (Previously presented) The system of claim 39, wherein the reaction component is selected from the group consisting of monomeric reaction components and polymeric reaction components.

41. (Previously presented) The system of claim 39, wherein the polymer synthesis comprises polynucleotide synthesis.

42. (Previously presented) The system of claim 41, wherein said analyzer program further includes an instruction to deliver reagents in a plurality of cycles.

43. (Previously presented) The system of claim 41, wherein said analyzer program includes an instruction to deliver reagents for deprotection, coupling, capping or oxidizing.

44. (Previously presented) The system of claim 41, wherein the specific value is determined by determining the amount of blocking group released from the growing polymer.

45. (Previously presented) The system of claim 44, wherein the blocking group comprises dimethyltrityl.

46. (Previously presented) The system of claim 39, wherein said plurality of wells comprises a multi-well plate.

47. (Previously presented) The system of claim 39, wherein said one or more wells is a subset of wells where failure is indicated.

48. (Previously presented) The system of claim 39, wherein said analyzer program includes an instruction to resume reagent delivery to said one or more wells if one or more criteria are met.

49. (Previously presented) The system of claim 39, wherein said analyzer program includes an instruction to resume reagent delivery to said one or more wells if the value of the synthesis is greater than the cost of the synthesis.

50. (Previously presented) The system of claim 39, wherein the value expected if incorporation of the reaction component into the growing polymer is successful and said specific value each comprises a plurality of measurements.

51. (Currently amended) The system of claim 50, wherein said analyzer program includes an instruction to provide a value indicating failure if the change in difference between the value expected if the incorporation of the reaction component into the growing polymer is successful and said specific value comprises an increasingly negative slope.

52. (Previously presented) The system of claim 39 further comprising a camera device configured to obtain an image of the plurality of wells.

53. (Previously presented) The system of claim 52 further comprising a lighting device for illuminating the plurality of wells.

54. (New) The system of claim 1, wherein chemical reactions continue to progress in wells where delivery is maintained but not in wells where delivery is discontinued.

Application No.: 10/762,931
Filing Date: January 21, 2004

55. (New) The system of claim 9, wherein chemical reactions continue to progress in wells where delivery is maintained but not in wells where delivery is discontinued.

56. (New) The system of claim 39, wherein polymer synthesis continues to progress in wells where delivery is maintained but not in wells where delivery is discontinued.